Contents

Preface	vi
Conference organization	vii
Sponsors	2
THIN FILM GROWTH AND RELATED TOPICS (I)	
A technological evolution from bulk crystalline age to multilayered thin film age in optoelectronic devices Y. Hamakawa	
Recent advances in island and multilayer growth of metals on metals far from equilibrium G. Vidali and H. Zeng	1
LEEM studies of the early stages of epitaxial growth E. Bauer	20
Low temperature growth of diamond-like films by cathodic arc plasma deposition PL. Chen, MY. Tsai and JS. Kao	30
Glow discharge sputtering deposition of thin films of Ag, Cr, Cu, Ni, Pd, Rh and their binary alloys onto NaCl and MgO. Experimental parameters and epitaxy F. Reniers, M.P. Delplancke, A. Asskali, V. Rooryck and O. Van Sinay	35
Diamond-like coating prepared by pulsed laser sputtering of graphite in a high-vacuum environment I.A. Bogonin, A.L. Karuzskii, N.N. Melnik, Yu.A. Mityagin, V.N. Murzin, A.A. Orlikovsky, A.V. Perestoronin, P.P. Sverbil, S.D. Tkachenko, A.V. Tsikunov, N.A. Volchkov and B.G. Zhurkin	4:
Structural and physical properties of Co films DC-bias-plasma-sputter-deposited on MgO(001) H. Qiu, T. Ohbuchi, H. Nakai and M. Hashimoto	4
Stability of BaTiO ₃ thin films on Si L.H. Chang and W.A. Anderson	52
Study of Ag thin films deposited on porous silicon T.F. Young, J.F. Liu, C.C. Wu, G.H. Fu and C.S. Chen	5
XPS studies on SiC thin layers formed by ion implantation with a metal vapor vacuum arc ion source H. Yan, R.W.M. Kwok and S.P. Wong	6
Characterization of low temperature GaAs grown by molecular beam epitaxy W.C. Lee, T.M. Hsu, JI. Chyi, G.S. Lee, WH. Li and K.C. Lee	60
A method to tune the island size and improve the uniformity for the in situ formation of InGaAs quantum dots on GaAs SZ. Chang, TC. Chang and SC. Lee	70
Growth mechanism of Ni on Pt(110) at low temperature C.S. Shern, J.S. Tsay and T. Fu	74
Epitaxial growth of ZnSe _x Te _{1-x} by the VPE method and its photoluminescence K. Mochizuki, H. Oguri, T. Kyotani and M. Isshiki	79
Effects of substrate cleaning and film thickness on the epitaxial growth of ultrahigh vacuum deposited Cu thin films on (001)Si C.S. Liu and L.J. Chen	84
THIN FILM GROWTH AND RELATED TOPICS (II)	
Surface reaction mechanism in MOCVD J. Nishizawa, H. Sakuraba and T. Kurabayashi	89

xii Contents

Very low temperature polycrystalline silicon films with very large grains deposited for thin film transistor applications K.C. Wang, T.R. Yew and H.L. Hwang	99
Tribological properties of smooth diamond films S.M. Pimenov, A.A. Smolin, E.D. Obraztsova, V.I. Konov, U. Bögli, A. Blatter, E.N. Loubnin, M. Maillat, A. Leijala, J. Burger and H.E. Hintermann	106
Textured diamond growth by microwave plasma chemical vapor deposition Y. Liou	115
Disordered Si/SiGe superlattices grown by ultrahigh vacuum chemical vapor deposition TC. Chang, WK. Yeh, CY. Chang, TG. Jung, WC. Tsai, GW. Huang and YJ. Mei	119
Characteristics of PECVD GaN thin films C.H. Lee and C.T. Chen	124
Ge deposition from digermane on the Si(100)-(2×1) surface HC. Cho	128
Growth of ZnSe thin films by radical assisted MOCVD method T. Aoki, M. Morita, S. Wickramanayaka, Y. Nakanishi and Y. Hatanaka	132
Growth of Zn δ -doped Al _x Ga _{1-x} As ($x = 0$ -0.65) by low pressure metal organic vapour phase epitaxy G. Li and C. Jagadish	138
Growth of the thin film Cd-Si-As system by metalorganic chemical vapor deposition H. Kayama, Y. Noda and Y. Furukawa	142
Mirror polishing of InP wafer surfaces with NaOCl-citric acid Y. Morisawa, I. Kikuma, N. Takayama and M. Takeuchi	147
Electrosynthesis of yttrium chalcogenides from a non-aqueous bath U.K. Mohite and C.D. Lokhande	151
Structural characterization of BaTiO ₃ films by sol-gel method using mono-substituting chelating agent WK. Kuo, JP. Wang and YC. Ling	155
The electrical and optical characteristics of GaAs on Si by modified flow rate modulation epitaxy M.K. Lee, C.C. Hu and C.Z. Hwang	159
Characteristics of spray pyrolytic ZnO thin films C.H. Lee and L.Y. Lin	163
Fluorine doped tin oxide films from spray pyrolysis of stannous fluoride solutions G.C. Morris and A.E. McElnea	167
Sprayed films of stannite Cu_2ZnSnS_4 N. Nakayama and K. Ito	171
Post cleaning of chemical mechanical polishing process CW. Liu, BT. Dai and CF. Yeh	176
OXIDATION, TREATMENT AND COMPOUND FORMATION	
Ultra-thin gate dielectrics grown by low-temperature processes for applications to ULSI devices HL. Hwang, PC. Chen and K.Y.J. Hsu	180
The properties of SiO ₂ films using direct photo-chemical vapor deposition on strained SiGe layers C.T. Lin, S.J. Chang, D.K. Nayak and Y. Shiraki	193
Porous silicon studied by Si L ₂₃ soft X-ray emission R.S. Crisp, D. Haneman and R. Sabet-Dariani	198
Application of irradiation-then-nitridation to improve the radiation hardness in MOS gate dielectrics KC. Lee and JG. Hwu	204
Rapid thermal post-metallization annealing effect on thin gate oxides MJ. Jeng, HS. Lin and JG. Hwu	208

Contents	xiii
Adsorption of H ₂ S on GaP(001) surface and passivation effects studied by AES, LEED and XPS Y. Fukuda, N. Sanada, M. Kuroda and Y. Suzuki	212
A theoretical analysis of the molecular and dissociative adsorption of H ₂ O on GaAs(110) R. Rincón, F.J. García-Vidal and F. Flores	216
AES and SRUPS studies on surface passivation of GaAs by (NH ₄) ₂ S _x sulfurization techniques J.T. Hsieh and H.L. Hwang	222
Surfactant modified growth of CuInSe ₂ thin films BH. Tseng, GW. Chang and GL. Gu	227
Influence of KCN treatment on CuInS ₂ thin films	221
Y. Ogawa, A. Jäger-Waldau, T.H. Hua, Y. Hashimoto and K. Ito	232
COMPUTER MODELING OF GROWTH MECHANISMS	
Atomistic dynamics of interfacial processes: films, junctions and nanostructures U. Landman and W.D. Luedtke	237
Computer simulation of nucleation on (001) Kossel crystal surface with and without diffusion T.B. Tang	257
Phenomenological approach in modeling of thin film nucleation from the liquid phase	
T.V. Sakalo and S.A. Kukushkin	261
CHARACTERIZATION TECHNIQUES OF THIN FILMS AND SURFACES	
Ultra accurate measurements of interface parameters with free-electron laser C. Coluzza	267
Photoemission spectromicroscopy and free electron laser spectroscopy of surfaces and interfaces G. Margaritondo and Y. Hwu	273
In situ X-ray reflectivity measurement of thin film growth during vacuum deposition CH. Lee and SY. Tseng	282
XPS study of the reaction of the Si(100) surface with a C ₂ H ₄ beam T. Takagaki, Y. Igari, T. Takaoka and I. Kusunoki	287
Electron paramagnetic resonance measurements on porous silicon	
T. Nakamura, K. Sasaki, K. Hayashi, H. Mimura and J. Kobayashi Photoellipsometric studies on CdTe thin films	291
P.D. Paulson and V. Dutta	295
Ellipsometric study of thermal and laser annealed amorphous and microcrystalline silicon films A.H. Jayatissa, M. Suzuki, Y. Nakanishi and Y. Hatanaka	300
Diffusion length measurements on electrodeposited CuInSe ₂ cells S.N. Qiu, C.X. Qiu and I. Shih	306
DYNAMICAL PROPERTIES OF THIN FILMS AND SURFACES	
Interface phase transition as observed in ultra thin FeSi ₂ epilayers J. Derrien, I. Berbezier, A. Ronda and J.Y. Natoli	311
High-temperature STM for atomic processes on semiconductor surfaces M. Iwatsuki, T. Sato and Y. Yamamoto	321
Interface effects in melting of Pb clusters on the Cu(111) surface E.Z. Luo, Q. Cai, W.F. Chung and M.S. Altman	331
Interdiffusion and reactions in the Cu/TiN/Si thin film system	331
Y.S. Gong, JC. Lin and C. Lee	335

xiv

The determination of the average compositions of amorphous interlayers in the V/Si system using a buried ultrathin oxide layer and a capping Mo layer to define the reference planes for interdiffusion J.H. Lin and L.J. Chen	340
Theory of dipole generation at cleaved semiconductor surfaces B. Chen and D. Haneman	345
Coalescence of cylindrical islands on the crystal surface accompanied by correlated changes of their heights and radii T.V. Sakalo and S.A. Kukushkin	350
ELECTRONIC, MAGNETIC, AND OPTICAL PROPERTIES OF THIN FILMS, SURFACES, AND INTERFACES	
Surface electronic properties of GaSe-covered Si(111) upon UHV thermal desorption of the GaSe epitaxial layer H. Reqqass, JP. Lacharme, C.A. Sébenne, M. Eddrief and V. Le Thanh	357
Schottky barrier formation for passivated semiconductor surfaces R. Saiz-Pardo, R. Rincón and F. Flores	362
Chemical trends of barrier heights in metal-semiconductor contacts: on the theory of the slope parameter W. Mönch	367
Investigation of the dosage effect on the activation of arsenic- and boron-implanted low-pressure chemical vapor deposition (LPCVD) amorphous-silicon films	
FS. Wang, MJ. Tsai, WK. Lai and HC. Cheng	372
Structural and electrical properties of excimer laser deposited PLZT thin films HF. Cheng	378
Structural characterization of epitaxial ferromagnetic MnSb layers grown by hot-wall epitaxy H. Tatsuoka, H. Kuwabara, M. Oshita, Y. Nakanishi, T. Nakamura and H. Fujiyasu	382
Refractive index behavior of boron-doped silica films by plasma-enhanced chemical vapor deposition R.H. Horng, F. Chen, D.S. Wuu and T.Y. Lin	387
Structural and optical properties of $Pd_{1-x}In_x$ thin films W.T. Wu, P.E. Schmid and F. Lévy	391
PL properties of porous Si anodized with various light illuminations H. Mimura, T. Matsumoto and Y. Kanemitsu	396
The influence of residual O ₂ gas in vacuum on the structural and luminescent properties of ZnF ₂ :Mn thin films Y. Nakanishi, S. Naito, T. Nakamura, Y. Hatanaka and G. Shimaoka	400
Study of the internal electric fields across the interfaces in the GaAs/(Al,Ga)As microstructures C.R. Lu, C.L. Chang, C.H. Liou, J.R. Anderson, D.R. Stone and R.A. Wilson	404
Band lineup modification by Ge interlayer deposition at II-VI/III-V semiconductor heterojunctions P. Rodríguez-Hernández, M. González-Diaz, M. Fuentes-Cabrera, A. Mujica and A. Muñoz	408
Interface of CuIn _{1-x} Ga _x Se ₂ /GaAs heterostructure BH. Tseng, SB. Lin, GL. Gu and HZ. Hsu	412
Surface charge transfer in plastically deformed Si B. Pohoryles and A. Morawski	417
ORGANIC AND POLYMER FILMS	
Electrochromic behavior of amorphous cobaltphthalocyanine thin films M. Masui, T. Ogawa and M. Takeuchi	421
Study of biochemical reactions in thin organic films by means of evanescent optical wave T.I. Ksenevich, A.A. Beloglazov, P.I. Nikitin, N.A. Kalabina and S.Yu. Zaitsev	426
In situ radiotracer method for study of adsorption on semiconductor single crystal surfaces M. Szklarczyk	431

Contents	XV

Microscopic theory of atomic properties of the surfaces of anharmonic crystals. Singular faces of fullerite C_{60} V.I. Zubov, N.P. Tretiakov and J.N. Teixeira Rabelo	436
Simulation of polymer film and surface behaviour in a space environment V.E. Skurat, E.A. Barbashev, Yu.I. Dorofeev, A.P. Nikiforov, M.M. Gorelova and A.I. Pertsyn	441
An electrochemical impedance spectroscopy study of thin polymeric films	
R. Borkowska, M. Siekierski and J. Przyłuski	447
THIN FILMS OF SUPERCONDUCTOR AND SURFACE AND THIN FILM MAGNETISM	
Electrical properties of laser deposited YBa $_2$ Cu $_3$ O $_{7-\delta}$ films on silicon wafers F.Y. Chuang, C.T. Lin, C.Y. Sun, H.F. Cheng and I.N. Lin	452
Pulsed-laser deposition of "diamond-like" carbon coating on YBa ₂ Cu ₃ O ₇ high-T _c superconductor films A.L. Karuzskii, N.N. Melnik, V.N. Murzin, V.S. Nozdrin, A.V. Perestoronin, N.A. Volchkov and B.G. Zhurkin	457
Investigation on origin of excess noise in superconducting and normal state BiSrCaCuO films A.L. Li and I. Shih	461
Magnetostochastic resonance as a new method for investigations of surface and thin film magnetism	
A.N. Grigorenko and P.I. Nikitin	466
Effect of substrate-film interface on magnetic properties of Mn ₄ N films	
KM. Ching, WD. Chang and TS. Chin	471
Coercivity of γ -(Fe _{0.74} Mn _{0.15} Co _{0.11}) ₂ O ₃ thin films by dc reactive magnetron sputtering WD. Chang and TS. Chin	475
Novel epitaxial growth and magnetotransport characterization of single crystal Co(1120)/Cr(100) superlattices on Mo buffer layers J.C.A. Huang, Y.D. Yao, Y. Liou, S.F. Lee, W.T. Yang, C.P. Chang, S.Y. Liao and C.H. Lee	480
ATOMIC AND ELECTRONIC STRUCTURES OF THIN FILMS AND SURFACES	
Semiconductor bond rupture phenomena and surface properties D. Haneman, N.S. McAlpine, E. Busch and C. Kaalund	484
Oxygen etching of the Si(100)-(2 × 1) surface Y. Wei, Y. Hong and I.S.T. Tsong	491
First-principles calculations of Ga adatom structures for Ge(111) and Si(111) surfaces C. Cheng and K. Kunc	496
Structural properties of Na adsorbed on a Ge(100)2 × 1 surface: all electron, ab initio, density functional, cluster calculations L. Spiess, E. Wimmer and P. Soukiassian	501
Structural evolution and atomic structure of ultrahigh vacuum deposited Au thin films on silicon at low temperatures C.R. Chen and L.J. Chen	507
XPS, AES and LEED studies of Cu deposited on Cr ₂ O ₃ (0001) surfaces Q. Guo, L. Gui, P.J. Møller and K. Binau	513
QUANTUM EFFECTS, QUANTUM WELLS AND SUPERLATTICES	
High quality quantum dots fabricated by molecular beam epitaxy CP. Lee and DC. Liu	519
Self-organized growth of InAs/GaAs quantum boxes J.M. Moison, L. Leprince, F. Barthe, F. Houzay, N. Lebouché, J.M. Gérard and J.Y. Marzin	526
Noise characteristics of an infrared hot-electron transistor C.H. Kuan	532
Voltage-tunable far-infrared photodetector with a very large tuning range	
Y. Huang and C. Lien	537

xvi Contents

Photoreflectance study of GaAs/Al $_{0.3}$ Ga $_{0.7}$ As resonant asymmetric double quantum wells with Si δ -doping in side barriers C.R. Lu, S.K. Du, J.R. Anderson, D.R. Stone and R.A. Wilson	54
Stimulated blue emission processes in Zn _{1-x} Cd _x Se/ZnSe multi-quantum wells J.Y. Jen, T. Tsutsumi, I. Souma, Y. Oka, J.R. Anderson and M. Gorska	54
Diffusion phenomena in MBE grown Si/SiGe single quantum wells studied by PL and TEM measurements H.P. Zeindl, S. Nilsson and E. Bugiel	55
Dopant activation and strain relaxation in P-implanted metastable pseudomorphic Ge _{0.12} Si _{0.88} grown on Si(100) D.Y.C. Lie, N.D. Theodore and J.H. Song	55
Improvement of optical properties of gas source MBE grown GaP/AlP short period superlattices J.H. Kim, H. Asahi, K. Asami, T. Ogura, K. Doi and S. Gonda	56
Light emission from the porous boron &doped Si superlattice TC. Chang, WK. Yeh, MY. Hsu, CY. Chang, CP. Lee, TG. Jung, WC. Tsai, GW. Huang and YJ. Mei	57
Novel light quantum and nuclear particle detectors based on the avalanche metal-resistivity layer-semiconductor structure Z.Y. Sadygov, I.M. Zheleznykh and T.A. Kirillova	57:
Theory of room temperature quantized resistance steps in electroformed metal-a-Si:H-metal structures J. Hajto, B. McAuley, A.J. Snell, G.H.W. Milburn and A.E. Owen	579
Effects of contact geometry in wide Hall bars H. Jou, W. Tsang and A.M. Kriman	58:
INDUSTRIAL APPLICATIONS OF THIN FILMS	
Electroluminescence in thin films R.H. Mauch	589
Si-based optical devices using porous materials H. Mimura, T. Matsumoto and Y. Kanemitsu	590
Thin film photovoltaics H.W. Schock	600
Correlation between light emission and dangling bonds in porous silicon M. Shimasaki, Y. Show, M. Iwase, T. Izumi, T. Ichinohe, S. Nozaki and H. Morisaki	617
Formation of bottom oxides in porous silicon films by anodic oxidation C.H. Lee, C.C. Yeh, C.H. Lee and K.Y.J. Hsu	621
Properties of multilayered thin films for thermal ink-jet printing devices D.S. Wuu, M.L. Lee and T.Y. Lin	626
Solar cells from thin films prepared by periodic pulse electrodeposition G.C. Morris and R.J. Vanderveen	630
Gas sensitive properties of copperphthalocyanine thin films M. Masui, M. Sasahara, T. Wada and M. Takeuchi	634
Surface fluorination of electrophotographic photoreceptors by plasma treatment for contact charging with a wet polymer roller M. Satoh, S. Matsumoto, T. Higashiguchi, M. Matsuda, T. Muranoi, I. Kikuma, Y. Momose and M. Takeuchi	635
Electrocatalytic activities of proton-exchanged layered oxides for the anodic oxidation on the solid oxide fuel cell K. Sato, S. Nomura and Y. Inoue	639
Effect of Nb metal ion in ${\rm TiO}_2$ oxygen gas sensor R.K. Sharma, M.C. Bhatnagar and G.L. Sharma	647
Tribochemical characterization of the lubrication film at the Si ₃ N ₄ /Si ₃ N ₄ interface sliding in aqueous solutions F. Honda and T. Saito	651
Carbon nitride – prospects for ultimate performance of superhard materials S.A. Uglov, V.E. Shub, A.A. Beloglazov and V.I. Konov	656
Reliability saudy of sub-micron titanium silicide contacts C.C. Lin, W.S. Chen, H.L. Hwang, K.Y.J. Hsu, H.K. Liou and K.N. Tu	660

Contents	XVII
Tungsten absorber on silicon membrane D.C. Li, C.S. Yoo and C.Y. Sun	665
Author index	673
Subject index	680



